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ABSTRACT OF THE DISCLOSURE

An overlay target with gratings thereon is illuminated and radiation scattered by the target is imaged onto detectors. A phase difference is then detected between the outputs of the detectors to find the mis-alignment error. In another aspect, an

5   overlay target with gratings or box-in-box structures is illuminated and radiation scattered by the target is imaged onto detectors located away from the specular reflection direction of the illumination in a dark field detection scheme. Medium numerical aperture optics may be employed for collecting the radiation from the overlay target in a bright or dark field configuration so that the system has a

10   larger depth of focus and so that the two structures of the target at different elevations can be measured accurately at the same time. Analytical functions are constructed for the grating type targets. By finding the phase difference between the two gratings at different elevations, misalignment errors can be detected. Analytical functions are constructed as a model for box-in-box type targets

15   where data points away from the edges of the box or bars can be used in the curve fitting. Symmetrical functions are employed to further reduce noise.